REMARKS

Applicant has amended claims 1, 12, 13, and 17 such that claims 1-5 and 12-23 are pending in this application. Applicant respectfully requests reconsideration, review, and allowance of all the pending claims.

Claim Rejections – 35 U.S.C. §103(a)

The Examiner rejected claims 1-5 and 12-23 under 35 U.S.C. §103(a) as being unpatentable over United States Patent No. 5,724,259 ("Seymour et al.") in view of United States Patent No. 5,121,137 ("Taki et al.").

Amended independent claim 1 recites a camera assembly for use in scanning a paper substrate of a printing press. The camera assembly includes a housing, a camera, a light source, and two mirrors. The two mirrors are positioned within the housing and symmetrically with respect to a plane that is perpendicular to the paper substrate of the printing press to direct light in two distinct paths that remain separate from the same said light source to the paper substrate to provide uniform illumination of a portion of the paper substrate using a single light source. The light is then reflected from that portion of the paper substrate to the camera.

Seymour et al. discloses a camera assembly including two light sources, each light source having an associated reflector for directing light to the web, as illustrated in Fig. 3(a) and described at col. 6, lines 3-7. The light sources are point sources of light, such as bulbs or strobe lights. The reflectors are circular Vromanoid reflectors, each surrounding a respective bulb and having a characteristic such that equal angles of light emitted from the light source translates into equal distances on the web (see col. 6, lines 3-34 and Figs. 3(a)-(c)). The two light sources and associated two reflectors are positioned symmetrically with respect to a plane that is perpendicular to the paper substrate in order to provide uniform illumination to the web. Seymour et al. at col. 7, line 1 suggests that illumination could be provided by a single strobe light or a plurality of strobe lights.

The Examiner notes that Seymour et al. discloses the use of a single light source but is silent on the number of reflectors when only one light source is used. The only type of reflector described in Seymour et al. is a circular Vromanoid reflector. Such a reflector, having a surface defined by rotation around an axis, can only be used in conjunction with a single point source of light. Therefore, if Seymour et al. were to use a single light source, it only

makes sense that a single reflector would be used. A second reflector would have no function using a single point source of light.

Seymour et al. fails to teach or suggest a single light source and two mirrors that direct light in two distinct paths that remain separate from the single light source to the paper substrate to provide uniform illumination of a portion of the paper substrate. As discussed above, Seymour et al. discloses single-light-source single-reflector combinations to illuminate a field of view. A second reflector is not positioned adjacent the same light source to direct two separate, distinct paths of light from that single light source toward the web.

Taki et al. fails to cure the deficiencies of Seymour et al. Taki et al. discloses a color exposing device for a color printer to print on a photosensitive medium 14, as illustrated in Fig. 1 and described at col. 8, lines 1-13 and lines 37-50. The device includes a light source 10, a collimator lens 11, a scanning portion 16, and a color modulating portion 20. The modulating portion 20 includes a separation prism 21, reflecting mirrors 22, 23, 25, and 26, a color combining prism 27, and three optical modulators 24R, 24G, and 24B. As shown in Fig. 1, the separation prism 21 separates the light from the light source 10 into three wavelength bands of light within the modulating portion 20.

Taki et al. defines a first wavelength band of light (i.e., red wavelength band) from the separation prism 21 that is reflected by the mirror 22, passed through the modulator 24R, and reflected by the mirror 25 toward the combining prism 27. A second wavelength band of light (i.e., blue wavelength band) from the prism 21 is reflected by the mirror 23, passed through the modulator 24B, and reflected by the mirror 26 toward the combining prism 27. A third wavelength band of light (i.e., green wavelength band) is directed through the prism 21, the modulator 24G, and to the prism 27. As described at col. 8, lines 23-27, the three wavelength light paths are combined into a composite exposing radiation (i.e., white light) in the prism 27 before a single, composite path of light is transmitted to the scanning portion 16. As shown in Fig. 1, the two mirrors 22, 25 are each disposed symmetrically opposite one of the two mirrors 23, 26 with respect to the path of light through the modulator 24G. The two mirrors 22, 25 and the two mirrors 23, 26 are also each parallel to the path of light, which is also parallel to the photosensitive medium 14. In addition, the two mirrors 22, 23 are each disposed symmetrically opposite one of the two mirrors 25, 26 with respect to an axis defined through each of the modulators 24R, 24G, 24B.

Taki et al. does not teach or suggest, among other things, a single light source and two mirrors to direct light in two distinct paths that remain separate from the single light source to the paper substrate. Taki et al. includes a light source that directs a single path of white light that includes color components grouped into three categories (i.e., red wavelength band, blue wavelength band, and green wavelength band) to a prism that first separates the color components and then re-combines the color components into a composite light path. The three color components are not distinct paths of light, but only separated wavelength bands of a single path of light. Taki et al. does not disclose two distinct paths of light emanating from the light source, or extending from the modulating portion to the photosensitive medium. The paths of travel for each of the wavelength bands are the same from the light source to the modulating portion, and from the modulating portion to the photosensitive medium. No combination of the mirrors and prisms disclosed by Taki et al. directs light in two separate, distinct paths of light from the light source to the photosensitive medium.

Taki et al. also fails to teach or suggest two distinct paths that remain separate to provide uniform illumination of a portion of a moving paper substrate. The modulators disclosed by Taki et al. modulate the intensities of the incident light beams according to the respective color signals from the wavelength bands of light. The intensities of each wavelength band depend on the source of light, and the intensity of each wavelength band can vary significantly. The wavelength bands are re-combined into white light (i.e., composite exposing radiation) prior to being directed to the photosensitive medium. *See col. 9, lines 7-27.* The wavelength bands defined by the device in Taki et al. do not travel in separate, distinct paths of light to uniformly illuminate the photosensitive medium. The composite exposing radiation is directed as a single light path toward the photosensitive medium to scan the medium, not to uniformly illuminate the medium.

In light of the foregoing, Seymour et al. and Taki et al., alone or in combination, do not teach or suggest the subject matter of independent claim 1. Therefore, independent claim 1 is allowable. Claims 2-5 depend from claim 1 and are allowable for these and other reasons.

Amended independent claim 12 recites a lighting assembly for a camera positioned adjacent a paper substrate of a printing press. The lighting assembly includes a light source and two mirrors. The two mirrors are positioned adjacent the light source, equidistant to a first plane defined by a surface of the paper substrate, and symmetrical with respect to a second plane that is perpendicular to the paper substrate and that passes through said single light source

without passing through the two mirrors to direct light in two distinct paths of equal length of uniform illumination from the same said light source to the paper substrate to provide uniform illumination of a portion of the paper substrate using the single light source. The light is then reflected from that portion of the paper substrate to a camera.

As discussed above with regard to claim 1, Seymour et al. does not teach or suggest, among other things, a single light source and two mirrors positioned adjacent that single light source to direct light in two distinct paths from the single light source to the paper substrate. As discussed above with regard to claim 1, Seymour et al. uses a single reflector for each light source. A second reflector in the device taught by Seymour et al. would have no function using a single point source of light.

Seymour et al. also fails to teach or suggest two mirrors that are positioned adjacent the single light source, equidistant to a first plane defined by a surface of a paper substrate, and symmetrical with respect to a second plane that is perpendicular to the paper substrate and that passes through the single light source without passing through the two mirrors. The reflectors disclosed by Seymour et al. are positioned equidistant to a first plane defined by a surface of the web defining a field of view. *See Fig. 3a.* However, a plane that passes through a light source disclosed by Seymour et al. and that is perpendicular to the web also passes through the reflector that corresponds to the light source.

Taki et al. fails to cure the deficiencies of Seymour et al. As discussed above with regard to claim 1, Taki et al. fails to teach or suggest a single light source and two mirrors to direct light in two distinct paths from the single light source to a paper substrate. The single light path taught by Taki et al. is separated into three wavelength bands of light and re-combined into a single, composite light path prior to reaching the photosensitive medium.

Taki et al. also fails to teach or suggest two mirrors that are positioned adjacent a single light source, equidistant to a first plane defined by a surface of a paper substrate, and symmetrical with respect to a second plane that is perpendicular to the paper substrate and that passes through the single light source without passing through the two mirrors. No combination of any two mirrors disclosed by Taki et al. are positioned such that the mirrors are both equidistant to a plane defined by a surface of the photosensitive medium, and symmetrical with respect to a plane that is perpendicular to the photosensitive medium, that passes through the light source, and that does not pass through the mirrors.

The two mirrors 22, 25 and the two mirrors 23, 26, each as pairs, are equidistant to a plane that can be defined by a surface of the photosensitive medium. However, these mirror pairs are not symmetrical with respect to an axis or plane that is perpendicular to the medium and that passes through the light source without passing through the mirrors. These pairs of mirrors are positioned on the same side of a plane that is defined in this manner. In addition, the two mirrors 22, 23 and the two mirrors 25, 26, each as pairs, are not disposed equidistant to a plane defined by a surface of the photosensitive medium. Thus, no plane perpendicular to the medium satisfies the limitations of claim 12.

In light of the foregoing, Seymour et al. and Taki et al., alone or in combination, do not teach or suggest the subject matter of independent claim 12. Therefore, independent claim 12 is allowable. Claims 21-23 depend from claim 12 and are allowable for these and other reasons.

Amended independent claim 13 recites a method of creating dual light paths directed toward a paper substrate of a printing press. The method includes supplying a light source, supplying two mirrors, and positioning the two mirrors adjacent the light source and at symmetrical and substantially equal distances from the paper substrate such that light from the same light source strikes the mirrors and light is redirected in two distinct light paths toward the paper substrate to provide uniform illumination of a portion of the paper substrate using a single light source. The light is then reflected from the paper substrate to a camera.

Seymour et al. fails to teach or suggest, among other things, supplying a single light source and two mirrors that are at symmetrical and substantially equal distances from a paper substrate to direct two distinct light paths from the single light source toward the substrate to provide uniform illumination of a portion of the substrate. As discussed above with regard to claims 1 and 12, Seymour et al. discloses single-light-source single-reflector combinations to illuminate a field of view. The configuration disclosed by Seymour et al. is not conducive to directing light from a single light source in two distinct paths that remain separate from the light source to the field of view because a second reflector for the same point source of light would have no function.

Taki et al. fails to cure the deficiencies of Seymour et al. As discussed above with regard to claims 1 and 12, Taki et al. fails to teach or suggest, among other things, supplying a single light source and two mirrors to direct two distinct light paths from the single light source

toward the substrate to provide uniform illumination of a portion of the substrate. Taki et al. discloses a device that directs a single, composite light path from a light source to the photosensitive medium for scanning the medium, and not to uniformly illuminate the medium.

In addition, Taki et al. does not teach or suggest supplying two mirrors that are at symmetrical and substantially equal distances from a paper substrate. No combination of two mirrors disclosed by Taki et al. is positioned at symmetrical and substantially equal distances from the photosensitive medium, as recited in claim 13. As shown in Fig. 1, each mirror of the various mirror pairs (e.g., mirrors 22, 23, mirrors 25, 26, mirrors 22, 25, mirrors 23, 26) is placed at different distances from the photosensitive medium.

In light of the foregoing, Seymour et al. and Taki et al., alone or in combination, do not teach or suggest the subject matter of independent claim 13. Therefore, independent claim 13 is allowable. Claims 14-16 depend from claim 13 and are allowable for these and other reasons.

Amended independent claim 17 recites a method for creating dual light paths of uniform illumination directed toward a paper substrate of a printing press. The method includes supplying a single light source and positioning at least two mirrors adjacent the single light source and symmetrically with respect to a plane that is perpendicular to the paper substrate of the printing press and passes through the single light source, such that the at least two mirrors are positioned on opposite sides of the plane and light from the single light source is split into dual light paths of equal length of uniform, non-collimated illumination. The dual light paths are directed toward the substrate by the at least two mirrors to provide uniform illumination of a portion of the paper substrate, and light is then reflected from that portion of the paper substrate to a camera.

Seymour et al. does not teach or suggest, among other things, positioning two mirrors adjacent a single light source so that the two mirrors are symmetrical with respect to a plane that is perpendicular to the paper substrate of the printing press and that passes through the single light source, and where the two mirrors are positioned on opposite sides of that plane. As discussed with regard to claims 1, 12, and 13, Seymour et al. does not teach or suggest positioning two mirrors adjacent one of the light sources. Rather, one reflector is positioned next to one light source. Each single-light-source single-reflector combination disclosed by Seymour et al. is positioned symmetrically with respect to a camera axis. While the camera

axis is perpendicular to the web, the camera axis does not simultaneously pass through either or both of the two light sources.

Taki et al. fails to cure the deficiencies of Seymour et al. As discussed with regard to claims 1, 12, and 13, Taki et al. does not teach or suggest positioning two mirrors adjacent a single light source to direct dual light paths toward a paper substrate. Only a single, composite light path travels from the light source to the photosensitive medium.

Taki et al. also fails to teach or suggest positioning two mirrors adjacent a single light source so that the two mirrors are symmetrical with respect to a plane that is perpendicular to the paper substrate of the printing press and that passes through the single light source, and where the two mirrors are positioned on opposite sides of the plane. No combination of any two mirrors disclosed by Taki et al. are positioned such that the mirrors are symmetrical with respect to a plane that is perpendicular to the photosensitive medium and that passes through the single light source such that the two mirrors are on opposite sides of the plane. While a plane that is perpendicular to the medium and that passes through the light source does exist, such a plane would have to bisect the mirrors in order for the mirrors to be symmetrically positioned. However, bisected mirrors do not satisfy the limitation of two mirrors "positioned on opposite sides of the plane," as recited in claim 17.

In light of the foregoing, Seymour et al. and Taki et al., alone or in combination, do not teach or suggest the subject matter of independent claim 17. Therefore, independent claim 17 is allowable. Claims 18-20 depend from claim 17 and are allowable for these and other reasons.

CONCLUSION

In light of the foregoing, Applicant respectfully submits that claims 1-5 and 12-23 are allowable.

The undersigned is available for telephone consultation during normal business hours.

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